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Cooperatives' Role in the Artificial Insemination Industry

Abstract

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Julie A. Hogeland
Cooperative Marketing Division
Agricultural Cooperative Service
U.S. Department of Agriculture

The artificial insemination industry provides breeding products and services for both dairy and beef cattle. Two-thirds of the industry is organized as producer-owned cooperatives. The industry has been so highly successful in meeting the needs of producers for a high-quality reliable product that the United States is the world's leading producer and exporter of bull semen. Yet, more bulls (and consequently more cooperatives) are available than are technically needed for genetic variation and breeding requirements. The result of such product proliferation is higher semen prices and excessive costs for inventory, distribution, and marketing. To maintain their prominent role in the industry, the 22 cooperatives need to consolidate to streamline the industry's structure. The cost savings from such restructuring would enable cooperatives to develop a significant program of biotechnology research.

Key Words: Cooperatives, artificial insemination, semen, dairy cattle, breeding

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Preface

Despite extensive study of the marketing practices and economics of the dairy industry, researchers have largely overlooked the important artificial insemination (AI) industry. Two notable exceptions are: "Study of Artificial Insemination Practices on U.S. Dairy Farms—Implications for Increased Semen Sales," June 1985, and the followup "Artificial Insemination on U.S. Dairy Farms," August 1987. These publications provided a much-needed look at AI marketing and use from the perspective of a large cross section of dairy producers.

This study extends previous work by examining the evolution of the AI industry, an evolution that dictates the strategic choices facing the industry and that is, to an extent not previously recognized, predictable. This study focuses in particular on AI cooperatives that with a market share consistently exceeding 60 percent, encapsulates the industry for many producers. Since the future course of the industry is predictable, and since the purpose of agricultural cooperatives is to give producers control over their economic future, dairy producers have a unique opportunity to mold the industry to meet their present and future needs.

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Highlights

The artificial insemination (AI) industry provides breeding products and services for both dairy and beef cattle. The primary product marketed by AI organizations is bull semen that is prepackaged as breeding units (straws) and preserved by freezing in liquid nitrogen.

Twenty of 22 AI organizations are organized as producer-owned cooperatives. The market share of cooperatives has consistently exceeded 60 percent since the industry began in 1939. Thus, cooperatives encapsulate the industry for many producers and, therefore, have a unique opportunity to meet their present and future needs.

The industry has been so successful in fulfilling producers' needs for a high-quality reliable product that the United States has become the world's leading producer and exporter of bull semen. Some 1,000 bulls are available to producers, who base choice on sire summary (production) information plus advertising. The latter has led to a high degree of product differentiation in the industry. Each bull is identified by a personalized name, analogous to a brand identity.

Producer surveys have shown that the choice of one AI organization over another is largely dictated by the variety of the product line. But competition among AI organizations (cooperatives included) has led to overcapacity within the industry. More bulls are available than are technically needed for genetic variation and breeding requirements. The consequence of such product proliferation is higher semen prices and excessive costs for inventory, distribution, and marketing.

A survey of 565 members of AI cooperatives indicated they wanted lower semen prices, especially for the premium-priced bulls, and access to any bull from any cooperative. Product shortages are a consequence of limited semen availability from bulls, technological constraints on the number of sperm per breeding unit, and excessive competition among cooperatives. The latter occurs insofar as shortages in one area are artificially induced to gain market share in another. Unlike their proprietary competitors who can simply sell wherever prices are highest, AI cooperatives routinely face tradeoffs between member and nonmember sales, and also between serving producers now and serving them in the future. These tradeoffs result from the fact that the financial backbone of each cooperative is its premium-priced bulls.

Cooperatives are spread too thin by the need to maintain a strong local presence in their membership area while simultaneously developing national and foreign markets. Consequently, the cooperative sector (and thus the industry as a whole) contains more organizations, more bull studs, and more bulls than are likely to be needed to provide a high-quality low-cost product to producers. This high-cost market structure results from the choice made by cooperatives to retain explicit marketing territories rather than to treat semen as the national market it has become.

A survey of co-op members indicated that producers want different bulls, not necessarily different cooperatives. The simplest response to this

situation is to give producers access to any bull from any cooperative, as they requested in the ACS survey, and—at the same time—to let price allocate supply nationally. Instead of semen, members could be allocated specialized services like technicians or custom mating programs that continue to be restricted by geography. Cooperatives have already reduced costs and excessive competition to the extent they have developed marketing federations or centralized production facilities. The cost-reducing possibilities of such measures would be maximized by eliminating all, or most, of the 20 local cooperatives in favor of a single centralized cooperative. Producers would become direct members of the new cooperative. Such consolidation would reduce industry overcapacity by eliminating marginal bulls and, at the same time, increasing the overall size of the product line relative to competitors. The cost savings from such restructuring of the industry would enable cooperatives to develop a significant program of biotechnology research. Without such a program, they risk their stake in the future of the industry.

Information for this report was obtained from managers of 12 AI organizations, Extension scientists, and, in particular, a survey of 565 dairy and beef producers who were members of 9 of the largest AI cooperatives. The survey contained six questions: (1) Why do dairy producers choose to use the semen and services of this particular cooperative? (2) Are there changes the cooperative could make to increase its AI services? (3) How can the cooperative work more closely with you as a producer? (4) What could the cooperative do to increase membership and/or volume of AI marketings? (5) What could the cooperative do to increase member commitment or involvement in the cooperative? and (6) How can the staff, management, and board of directors of the cooperative best serve members?

In most cases, producers were randomly selected for participation in the survey.

Survey responses, and the comments of managers and scientists, indicate that little difference exists between the day-to-day operating practices of AI cooperatives and their competitors. Therefore, discussion of the cooperatives and their practices will be part of an overview of the entire industry.

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Cooperative Marketing Division
Agricultural Cooperative Service
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OVERVIEW

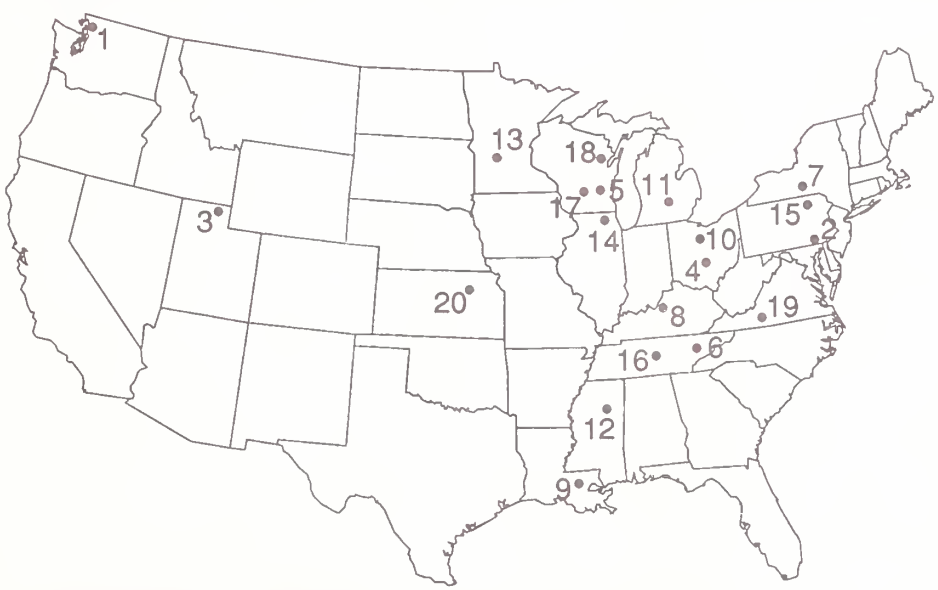
The artificial insemination (AI) industry provides breeding products and services for both dairy and beef cattle. The primary product marketed by AI organizations is bull semen that is prepackaged as breeding units (straws) and preserved by freezing in liquid nitrogen. Services include breeding advice and assistance. The advantages of AI over natural service include access to a wider variety of bulls, thus incorporating the most recent genetic advances, and elimination of potential safety hazards from live bulls.

In 1987, 22 organizations marketed breeding units (fig. 1). Total industry sales for 1987 were $236.3 million, representing 18.9 million breeding units (assuming an average price of $12.50 per unit). Most units were sold to dairy producers because traditional herd management practices for beef cattle complicate heat detection. Of these, 3.8 million units (again, primarily dairy) were exported.

Twenty AI organizations are organized as producer-owned cooperatives (fig. 1). Each cooperative markets locally to surrounding States and, through federations or sales associations, to other regions of the United States or foreign markets. With 12 member cooperatives, Select Sires is the largest federation, followed by Federated Genetics (Eastern AI, Atlantic Breeders, and Louisiana Animal Breeders Co-op), and Allied Genes (Sire Power, Noba, and Kabsu).

Generally, a producer qualifies for member-

Figure 1—Location of AI Cooperatives in the United States



1. All West/Select Sires
2. Atlantic Breeders Cooperatives
3. Cache Valley Breeding Assn.
4. COBA
5. East Central/Select Sires
6. East Tennessee Artificial Breeders
7. Eastern AI
8. KABA
9. Louisiana Animal Breeders Cooperative
10. NOBA
11. MABC/Select Sires
12. Midsouth Animal Breeders Cooperative
13. Minnesota Select Sires
14. Praire State
15. Sire Power
16. Tennessee Artificial Breeders Assn.
17. Tri-State Breeders
18. 21st Century Genetics
19. Virginia-North Carolina Select Sires
20. KABSU

ship in an AI cooperative by purchasing at least a small amount of semen throughout the year from the cooperative within the area designated by the cooperative as its member area. Sales outside this area are considered nonmember sales.

Membership in individual cooperatives varies from several hundred to some 30,000 producers, depending on the region served by the cooperative and the intensity of dairy production. Smaller cooperatives tend to be associated with State universities or agricultural colleges, which was the case for many AI cooperatives during the early years of the industry.

Since the industry began in 1939, it has succeeded in consistently developing and delivering such a high-quality product to producers that the United States is the world's leading producer and exporter of breeding units. The industry offers producers a wide choice of bulls. For example, the January 1988 sire summary listed 634 active (available for sale) bulls. If the number of bulls in the process of progeny testing are added to the active AI list, some 1,000 bulls are available to producers. Most organizations also offer a wide range of prices for breeding units, typically, $4 to $200. Nevertheless, most bulls are priced below $15, and volume discounts are generally available. Higher prices reflect the scarcity and desirability of traits associated with certain bulls.

The AI industry has achieved this performance level despite unusual constraints. For example, the industry has considerably less control over product prices, availability, and quality than comparable manufacturing industries. Product marketing revolves around yearly catalogs issued by each organization featuring sire summary data accompanied by pictures of bulls and their daughters. The availability of a new sire summary from USDA every 6 months requires updates through promotional flyers, videos, and meetings with AI sales representatives. As more information about the quality of each bull becomes available, product prices and demand can fluctuate substantially, causing unanticipated inventory accumulation. Product shortages can also occur because bulls vary in their ability to produce semen.

Product Development in the AI Industry

The small number of offspring produced in a cow's lifetime, compared with the multigenerational breeding potential of bulls, leads to a correspondingly greater emphasis within the industry on the sire summary than on the cow index. Each is a record of performance of daughters weighted by trait information on the parent, the parent's ancestors, and relatives. The "weight" given to any of these factors depends on the computational method preferred within the industry at any given time. The sophistication of the methods used to evaluate the genetic potential (genotype) of cows and bulls has depended on the development of computer techniques to analyze greater amounts of information. By contrast, during the early 20th century, methods of ascertaining genetic merit were not readily available. So selection was made on the basis of the theory that "like begets like," and thus the animal's appearance (phenotype) become the criteria used in breeding decisions.

The production records of daughters of bulls are used to calculate a "predicted difference," plus or minus, that a particular sire will on average contribute to a herd. Only predictions about the average are possible because the inheritance of one trait or another depends on the genes actually transmitted to the offspring, out of all possible combinations of the parent's genes. For this reason, genetic analysts refer to the "sampling nature of inheritance."

The probability or statistical evidence that a bull is in fact transmitting certain traits on average is based on the number of daughters, the number of herds containing these daughters, and the number of lactation records per daughter. This probability is called "repeatability."

"Predicted difference" (PD) and "repeatability" have been the core concepts of the sire summary for many years. In July 1989, modifications in the way sire summaries and cow indices are calculated resulted in the replacement of the term "predicted difference" with "predicted transmitting ability" (PTA), and "repeatability" with "reliability."

These changes in the method of genetic evaluation include a shift in the genetic base from 1982 to 1985. A genetic base is defined

with reference to a specific breed, a specific trait, a specific geographical area, and a specific point in time. The first three factors are simpler to establish than the latter, because a separate genetic base is usually established for each trait in each breed for an entire country. In contrast, the period of time covered by the base can be fixed, moving (changing annually), or, as in the United States, stepwise or changing every 5 to 10 years. A stepwise genetic base enables cows and bulls to be ranked for genetic merit using as a reference point "average" bulls (those with a "predicted difference" of zero) during a particular (base) year. Since genetic progress is continual, it is necessary to reestablish the base every few years to account for the fact that the "average" bull or cow of, say, 1990, will exceed the average of 1950. This procedure more clearly identifies animals that lead to a better-than-average performance over a given period.

Sire summaries are developed in the spring and fall, and a Sire Summary List is published semiannually by the USDA Animal Improvement Programs Laboratory in Beltsville, MD. Production information used to derive the genetic evaluations of bulls is obtained from "cooperator" herds, those participating in the Official Dairy Herd Improvement and Dairy Herd Improvement Registry (purebred) recordkeeping plans. These records are used to update the sire summaries of bulls in active AI service (those whose semen is sold commercially) and to generate sire summaries for young bulls, a process called "proving" or "progeny testing." Only about 15 to 20 percent of all bulls tested are considered good enough (that is, above average) to be used for AI service. Of this figure, only about 5 percent become the "top" bulls, those that are sufficiently unique to command a price premium. Nevertheless, industry analysts note that the genetic performance of a bull who has barely qualified for commercial AI service will typically exceed the quality of a bull routinely retained within a herd for natural service.

Marketing Approach Used by the Industry

The wide array of bulls offered by the industry and the regional variation in the demand for bulls and milk products has led to a high degree of product differentiation within the industry. Each bull is identified by a personalized name, analogous to a brand identity. By providing highly detailed information on a wide range of bulls, sire summaries themselves encourage producers to fine-tune their preferences and chose bulls individually. Product differentiation also insulates each organization from competition insofar as the name or identity of the organization becomes synonymous with the name of its top bulls.

The AI industry became highly competitive when freezing, introduced in 1954, reduced the perishability of semen and enabled it to be shipped worldwide as a trade commodity. This development eliminated the need for narrow marketing boundaries imposed by liquid semen. Although most AI organizations focus on a local clientele—reflecting traditional marketing boundaries—all directly or indirectly compete with each other in national or international markets.

The ease of entry into the industry further intensifies competition. The probability of developing a superior bull is 5 percent, irrespective of whether the bull is developed by small investor groups (syndicates) or by the production facilities (bull studs) of AI organizations. Bulls developed by syndicates are usually sold or leased to an AI organization. As a result, all AI organizations list at least one premium-priced bull which is the financial mainstay of the organization. Because this key aspect of performance is not influenced by size, the fragmented structure of sire proving carries over into semen production and marketing, accounting for the wide variation in size among organizations.

The AI industry has continued to emphasize differentiation as a marketing strategy despite the fact that competition has approached a level associated with products that are fungible, standardized, or homogeneous.

Signs of strain are already apparent. Routine semen exchanges among AI organizations in lieu of purchases on the open market help each organization perfect its lineup using the most up-to-date genetics. While this situation improves producers' access to desirable genetics at a wide range of prices, it ultimately increases product homogeneity as the traits of a particular sire permeate the lineups of all organizations. For example, in 1987, Hoard's

Dairyman noted that more than 15 percent of the active AI Holstein sires that appeared on price lists were sons of one sire, and nearly 16 sons of this sire were already in active service. This problem is particularly acute for the minor breeds and may be the reason some large dairies standardize semen selection by routinely choosing the cheapest semen available.

AI organizations also counter product similarity by differentiating other aspects of their operations. These include the size of the lineup, average PD dollars, average PD type, top 20 percent of bulls, top 100 Total Performance Index (TPI), or repeatability top 100 PD dollars. Other criteria are geographic region served, type of producer targeted as the primary customer (breeder, commercial producer, or those with minor breeds, for example), availability of specialized services like embryo transfer, speed of turnover of bulls in the lineup, and policies toward foreign trade or syndicate bulls. Organizational identity as a cooperative can also be important to producers.

MARKETING STRATEGY AND INDUSTRY MATURITY

The Development of Industry Maturity

By emphasizing differentiation, the AI industry is driven by marketing and advertising to such an extent that some have stated "It's all marketing." In the context of product life cycle—a framework for analyzing changes which typically occur in a product and its demand through such phases as introduction, growth, maturity, and decline—an emphasis on marketing normally belongs in the growth phase.

Thus far, the development of the AI industry has followed the path described by the product life cycle.

Introduction Phase

Key characteristics of the introductory phase are (1) the need to convince buyers to try the product, (2) a highly-skilled labor content, and (3) specialized distribution channels.

After techniques were developed in 1939 for collecting, evaluating, processing, and shipping liquid semen, an educational outreach by agricultural colleges and dairy extension workers established the foundations for AI organizations as farmer-owned cooperatives. Technicians employed by AI organizations provided the skilled labor and specialized distribution (onfarm inseminations) essential for product delivery in an era when producers knew little about AI.

As product markets grow, prices typically decrease during the introductory phase but are still fairly high. The high profits that result intensify competition and turnover among firms. This sequence also appeared in the AI industry. Many of the early associations failed due to insufficient volume, capital shortages, and poor management. The attractive balance sheets and assets of the surviving cooperatives led to the entry of other firms into the industry. Competition intensified when freezing made semen into a trade commodity that could be shipped worldwide or stored for many years with fertility maintained.

The need for technicians was reduced as the new entrants began training dairy producers to inseminate cows. This shifted the focus of the industry to direct herd sales, although most cooperatives continued to provide technicians as part of a "complete AI service" to producers.

Growth Phase

Marketing is the key function of the growth phase of a product. As the buyer group widens, competitive improvements are made based on new possibilities for technical and performance differentiation of the product. This gives manufacturers latitude to refine their price or quality image. A price line exists for all tastes, from premium to low. As overall product quality improves, buyers begin to focus on product reliability. In the AI industry, improvements in product reliability were signaled by important changes in sire summaries.

During the growth stage, product proliferation occurs in response to the diversity and fine tuning of buyer preferences. Yet as buyers learn about the product and the characteristics of competing brands, they streamline their preferences, reducing the need for product proliferation and differentiation. As a result, products have a tendency to become more like commodi-

ties over time. In turn, competition among suppliers will increase to the degree that buyers view products as interchangeable.

Maturity Phase

The product life cycle predicts that, at maturity, the power of buyers increases because the market has become a mass market, possibly even saturated. Repeat buying occurs, and buyers routinely choose among brands. At this stage, product quality is superior. During maturity, manufacturers try to extend sales by broadening the product lines and increasing services or deals. Physical distribution costs are high due to the broad product lines. Advertising intensifies into a competitive battle. Markets are segmented or targeted for particular customer categories.

These developments affect product prices. Overcapacity typically coexists with price competition. Buyers are already aware of the benefits to expect from the product, which reduces its novel value. Simultaneously, the need of buyers for the differentiating factor falls, and imitation of the product narrows perceived differentiation. Consequently, the product enters a no-growth phase and buyers become very cost conscious. Buyers begin viewing brands in terms of a number of price-quality niches; "good," "better," "best." Each niche is identified by a narrow range of prices separated by large gaps.

These hallmarks of maturity seem to reflect changes underway in the AI industry starting with (a) an increase in buyer power, (b) high distribution costs, (c) the development of overcapacity within the industry, and finally, (d) increasing price sensitivity among buyers.

Sources of Market Power in the AI Industry

In any industry, buyers and sellers differ in bargaining power. Criteria that increase the power of buyers (domestic dairy producers) include:

1. *Low concentration of suppliers.* For dairy domestic sales, the market share of the top 4 AI organizations was 68 percent in 1987 (including some cooperative federations or groups of cooperatives marketing as a unit). The market share of the cooperative sector (all cooperatives taken individually) was 64 percent in 1987. Yet the average market share per cooperative was only 3.5 percent.

2. *Buyers do not depend on particular suppliers for a substantial fraction of purchases.* In the AI industry, large dairy producers are able to squeeze price concessions from AI organizations seeking volume sales. This situation, found mainly in the Southeast and California, will likely increase in the future throughout the United States as the dairy sector consolidates into fewer, but larger, production units. In general, AI organizations are dependent on their customers to an unusual degree because dairy producers not only buy the product (breeding units) but they also supply it through sire-proving programs.

Growth of direct herd sales has reduced supplier power by eliminating the close link between producer and organization created by technicians. To some extent, this link has been re-established by the development of custom mating services, a program where the AI organization uses specially selected criteria to target specific bulls to improve individual herds (generally through mating to specific cows). The methods used to select such bulls are not standardized across organizations. Thus, the locus of choice is automatically narrowed to one organization at a time, and, in fact, industry observers indicated that such services were rarely purchased from more than one organization.

Custom-mating services are popular across all categories of AI users. The 1986 survey of dairy producers by Ohio State University indicated that, among producers using AI exclusively, 40 percent purchased these services; among high users of AI for both heifers and cows, 43 percent; among low users for heifers and cows, 34 percent; and for low users on cows alone, 23 percent. The popularity of such programs may result from the opportunity they present for personalized education since some industry specialists consider random matings of selected bulls to cows scientifically adequate to upgrade herds. These programs are also a marketing tool since "it is obviously better, as a matter of strategy, to create good buyers that are locked into a particular firm than to create ones that will be good buyers for any competitor."

3. *Switching products is not costly to buy-*

ers. The Ohio State study found that dairy producers often used several AI organizations to purchase semen. For example, 72 percent of those surveyed with more than 86 cows used more than one AI organization and, at the other extreme, 38 percent of producers with less than 40 cows did likewise.

4. *The product has many substitutes.* The "uniqueness" of the product lines across AI organizations was evaluated using a statistical technique called "analysis of variance." This technique indicates whether the average of one group differs significantly from the average of comparable groups. The analysis was based on 1987 price lists obtained from five AI organizations (both cooperatives and proprietary organizations). The traits evaluated were yields for milk, fat, and protein, and percent protein. Results showed no significant differences between lists, a finding consistent with the observation of industry specialists that "no AI organization had a corner on all the good bulls" and, across organizations, "all bulls were alike."

The general principle underscoring the importance of either technician services or custom-mating programs to the industry is that vulnerability to competition created by similar product lines can be offset by providing more service with each sale, a form of "value added."

5. *Sellers are unlikely to engage in forward integration whereas buyers have the option of backward integration.* Forward integration would require AI organizations to go into milk production, a highly unlikely scenario. Yet the Ohio State study indicated that many producers used a combination of AI and natural service, especially for heifers, as herd size increased. This is a form of tapered integration, where some needs are produced onfarm and the rest are purchased from outside suppliers.

6. *Buyers face low information, shopping, or negotiating costs.* In the AI industry, the reverse is true, for several reasons:

a. The quality of the offspring is variable, irrespective of the price paid for semen. Differences between the sperm of a single bull contained in a breeding unit are as great as the differences among bulls in an entire lineup. Consequently, excellent bulls will have a certain number, however small, of poor daughters, and poor bulls can likewise produce a small number of topnotch offspring. Producers necessarily have to base breeding decisions on probabilities (repeatabilities); therefore, they do not know in advance what will be the outcome of the breeding program.

b. The lag between getting a cow settled and adding a heifer to the milking string is about 3 years. In the meantime, a bull's second proof may reveal drawbacks that cause the bull to be dropped from the lineup, yet the producer is stuck with the heifer. This increases the cost of personal evaluation and trial use of a bull.

c. The heritability of milk production is approximately 25 percent, so about 75 percent of the variability in milk is due to difficult-to-measure environmental influences. Consequently, AI organizations seldom provide product guarantees.

A 1987 Ohio State study concluded that "low cow" users offered the greatest potential for increasing semen sales, although this category was somewhat skeptical about the benefits of AI. USDA production data was less important to these users than the experiences of other dairy producers. The same study highlighted the important role of AI sales representatives in influencing producer decisions, a role ranked second only to veterinarians. Yet the highly competitive structure of the industry typically limits the time spent per farm by AI sales representatives to about 15 minutes, according to industry observers. As a result, subtle kinds of market information gained through personal contact are lost, even though such contact could reduce uncertainty associated with AI use, or offset unrealistic expectations created by advertising.

Impact of Product Information on Industry Credibility

In a 1985 Ohio State study, dairy producers were surveyed to determine sources of information used for sire selection. In order of ranking, these were:

1. USDA production (sire summary) data
2. Calving ease data
3. Breed-association-type data
4. Pedigree of sire
5. AI organization linear data (custom-mating programs)

6. Breed association linear data
7. Pictures of the bull's daughters
8. AAA- or DMS-type rating
9. Picture of bull

The first-place ranking of sire summaries and the low ranking of pictures suggest that producers emphasize the most appropriate and technical information in sire selection. Yet the ACS survey of managers of AI organizations suggests that a critical issue is how is information packaged and presented to producers. One manager commented "We didn't sell much of a bull with good numbers until we printed flyers with colored pictures. A sire directory must be in color to be competitive." Another manager noted that bulls with good numbers often got overlooked by producers unless such bulls were highlighted in sales meetings or promotional flyers.

Consistent with these perceptions, industry specialists commented that many producers lack an adequate understanding of sire summaries. Producers may consider sire summaries the most important source of information, but this information arrives in sire directories, which are a promotional tool. Within a sire directory, the production numbers are on the same page as pictures of the bull and daughters, which can inadvertently inhibit a single-minded focus on production numbers.

Rapid turnover of bulls also confuses producers. Bulls are added and deleted from the lineup of AI organizations for the following reasons: (1) Statistically, for bulls as a group, the results of the first proof are similar to the second proof, which is incentive not to delay adding a promising bull to the lineup. (2) New bulls are a response to producer pressure. From a technical standpoint, producers want to make certain their breeding units capture the most recent genetic advances, and, as consumers, they like change and variety. Not surprisingly, the ACS survey indicated that respondents wanted information meetings or an updated sire directory as soon as each new proof was released. (3) Rapid genetic change implies that a bull's lifetime in a lineup is shortened. Extensive promotion starting with the first proof enables the AI organization to maximize revenue from the bull. (4) Newer bulls represent the genetic frontier because genetic improvement is progressive. Bulls only get better. (5) Rapid introduction of bulls may reflect newly achieved scale economies corresponding to the industry's transition from local to global marketing.

The net result of high information costs is that credibility is, to some degree, an industry problem. All AI organizations are vulnerable to loss of credibility among producers resulting from poor performance from an otherwise promising bull. Some organizations have attempted to minimize this risk by listing only those bulls that meet a level of repeatability on a par with a second proof. Other organizations take the opposite approach by appealing to the readiness of a segment of producers to gamble on very new, but promising, listings. These producers hope to improve their herd at a lower cost than if they waited until the bull became a known quantity with correspondingly higher prices. If, instead, the second proof on such bulls is weak, the organizations and producers suffer a setback that essentially represents a "cost of doing business." Either approach represents yet another way AI organizations can differentiate themselves.

Another reason promising bulls may be readily included in the active AI list has to do with the expense of proving bulls beyond a certain criteria or repeatability. For example, Hoard's Dairyman noted that at least seven units of semen are probably required for every daughter that appears in a sire's proof. "To get an initial proof with 50 tested daughters ... would require distributing a minimum of 350 to 400 units of semen. And, with the emphasis on higher repeatabilities, most are trying to do much better than this." This may be an additional reason that syndicate bulls (who usually have a first proof based on a smaller number of daughters than sires evaluated through the young sire program of major AI organizations) are included in the lineups of most AI organizations.

In general, only about 1 in 10 bulls will make the active lineup of all those proven. The costs of proving each bull ranges from $10,000 to $20,000. Thus, the survivor must carry the costs of the nine rejects before starting to earn a profit for the AI organization. This situation ultimately raises the price of all AI bulls.

Information Transmitted by Prices

The price of the product also has an effect on shopping and bargaining costs. Low-priced products do not necessarily merit time spent in bargaining or evaluation. They become convenience goods. In a sense, semen would seem to fall into this category because most breeding units are priced under $15. Yet the total cost of a breeding program may be substantial. Although NAAB estimates that only 1.7 units of semen are generally required to get a cow bred, in reality at least 2, and sometimes as many as 7-10, matings may be needed to get one replacement heifer, considering spontaneous abortions, fatalities, failure to conceive, and the 50-percent probability of getting a bull calf.

Nevertheless, there is a segment of dairy producers who are, for economic reasons, less sensitive to price, which affects the bargaining power of the rest of the industry.

The price sensitivity of buyers is reduced when (1) they follow a high-quality strategy, (2) the input is perceived to enhance the performance of the product, and (3) the input carries a prestige value which reinforces the high-quality strategy. These are characteristics of breeders.

In more general terms, differentiation that is difficult to measure generates a price premium when the buyer perceives a great deal to be at stake, such as reputation or status. Because status and prestige are as important as the technical attributes of a product or its quality, the price sensitivity of other producers is reduced insofar as their decisions are influenced by breeders. And, in fact, industry observers and the ACS survey suggested that breeders sometimes are perceived by other categories of producers to have a disproportionate impact on the production and marketing decisions made by AI organizations.

Buying "the best" is also a response to uncertainty and inadequate information. Uncertainty is increased when, as in the case of breeding units, the product's impact on buyer cost or performance is subjective, indirect, or hard to quantify. Because many producers don't understand sire summaries, they (according to industry observers) assume that a high price means high quality. This critical assumption generates an increased demand for the bull, which increases prices further. Producers who cannot afford a high-priced sire are encouraged to buy sons of the sire (product imitations). Such product proliferation is a consequence of the effort by AI organizations to supply a price line for all tastes.

Consequently, suppliers do not have much market influence or power relative to buyers, except in the important area of information (what information is presented, how it is presented, frequency, timeliness, interpretation, and so forth). The fact that supplier power is limited by so many other factors suggests that AI organizations will continue their emphasis on advertising and other forms of product marketing, although some changes will occur. Side-by-side comparisons of bulls will probably be easier in the future due to combined efforts of AI organizations and breed associations to simplify, combine, and clarify alternative sources of information.

Distribution Costs

There are two sources of further growth in the AI industry: heifer AI and foreign sales, particularly to developing countries.

Additional growth possible through increasing heifer AI may be limited by the current structure of the industry and by producer preferences. In 1987, Hoard's Dairyman noted that only about 25-30 percent of dairy heifers were bred to AI sires compared with 65 percent of dairy cows. Heifers are often separated from the milking facility, making them less accessible for AI and less observable for heat detection. Resolving other difficulties associated with heifer AI, such as problems with conception or calving, often requires personalized planning and help from AI sales representatives. Such assistance is generally given only at the request of the producer and is not routinely available in the context of a 15-minute farm visit. This represents a loss of efficiency within the industry because heifers represent the peak genetic potential of cows.

For these reasons, foreign sales have been perceived as an easier route to growth. Many overseas sales are made to brokers who assume the costs of distribution to individual farms. The primary expense associated with foreign

sales is market development through educational and training programs about AI. Often some of this expense is absorbed by the National Association of Animal Breeders, Columbia, MO, the trade association of the industry, through the market development programs of the Foreign Agricultural Service of USDA.

The foreign market not only has lower distribution costs but also, to some degree, less price sensitivity than the domestic market. Nevertheless, the price sensitivity and bargaining power of importers is increasing as they become familiar with the prices and products offered by domestic suppliers. Moreover, key export markets for the United States, notably Western Europe, are themselves becoming exporters, competing with the United States for markets in developing countries.

Consequently, the domestic market is and will continue to be the primary focus of AI organizations, particularly among cooperatives, which were formed for the explicit purpose of serving domestic producers.

Distribution costs are unavoidably high in the domestic market due to the decentralized nature of the industry. Sales representatives from each locally based AI organization and from competitors seeking market share canvass areas of intensive dairy production about every 3 to 6 weeks, each delivering product, each servicing nitrogen tanks, and each providing product information. This situation is typical of Wisconsin, New York, Pennsylvania, and other parts of the North-Central United States.

In areas where dairy production is less intense, like the Southeastern United States or California, independent dealers carrying relatively small amounts of semen from several AI organizations predominate. Such dealers are also called "semen jockeys"; their practice of purchasing semen from one region of the United States where it is relatively plentiful and reselling in an area with shortages occurs across the entire industry. The need for certain kinds of semen, such as for colored breeds and very new "hot" bulls, is sufficiently great among producers that they are willing to buy from the jockeys, although the quality of the semen may have deteriorated from excessive handling. The retail markup for semen varies from 35 to 50 percent, giving a jockey considerable price flexibility. Semen jockeys will become a more familiar phenomenon as the dairy industry concentrates into fewer producers.

In the past, producers were implicitly tied to their local AI organization through the perishability of liquid semen and the need for technician services. Yet the modern AI industry of "do it yourself" techniques and frozen semen transcends the concept of local marketing territories and extends the scope of semen marketing to national and international dimensions. Thus, high distribution costs resulting from overlapping marketing territories reflects a conflict between old and new ways of marketing semen.

Development of Overcapacity Within the Industry

Another problem confronting AI organizations is the variable semen production among bulls. The technology of freezing requires that each breeding unit contain about 10 million sperm to significantly increase the probability of conception. The result is periodic product shortages, generally reflected in steadily increasing prices for particular bulls. (This situation does not necessarily conflict with using differentiation as a marketing strategy because differentiation often requires a perception of exclusivity incompatible with high market share.)

Moreover, the AI industry has responded to shortages by product proliferation. Some other reasons contributing to the size of price lists are: (1) limited semen output from the top bulls, (2) the need to serve both foreign and domestic markets, (3) the need to allow producers scope for choice, such that they can establish a criteria (for example, PD$) at a certain level and eliminate bulls falling below that criteria, (4) the need to meet competitive pressures by boosting the size of the lineup or the number of bulls progeny-tested, (5) excessive inventory accumulation resulting from significant differences between the first and second proof, and, sometimes, (6) a perception that cooperatives serve everyone and, therefore, have an obligation to meet the needs of a broad spectrum of dairy producers, irrespective of market share. The 1987 Ohio State study found that producers rated a large selection of bulls as the most important consideration in selecting a semen-producing organization.

The net result of product proliferation is

overcapacity within the industry. More bulls are available than are technically needed for genetic variation and breeding requirements. An indication of the extent of overcapacity is provided by calculating the minimum number of bulls needed to service the industry.

How many bulls do producers need? The industry average for the number of breeding units per year from a bull at full production is 30,000 units. Dividing this number by the number of breeding units sold (in 1986, 16 million) suggests that only about 533 bulls were essential to service the industry. Yet, twice that number are available through progeny testing and the active AI list.

How many bulls do producers use? The 1985 Ohio State study divided AI users into several categories: low heifer-high cow, high heifer-high cow, and low cow. Across categories, an average of 11 bulls were used yearly. The "high heifer-high cow" group used an average of 13 bulls; the "low cow" group used 8. Consistent with this information, industry observers believed 20 percent of the available bulls supplied about 80 percent of the market.

Under current industry conditions, no one organization can risk losing its market share by cutting its lineup. Thus, the consequence of overcapacity is continued; higher semen prices and excessive inventory costs. This situation perpetuates itself to the extent shortages force producers to use more than one AI organization.

MARKETING STRATEGY ASSESSMENT

Implications of Increasing Price Sensitivity Among Buyers

The intermediate stage between the progression from the growth phase to the maturity phase has been labeled "competitive turbulence." In the AI industry, this stage intensified during the 1970's. The circumstances initiating this stage—a decline in dairy cattle numbers, sales volume leveling out at about 55 percent of the milk cow population, and a slower growth in beef AI than anticipated—will likely spur further consolidation. Although these structural changes have brought about important and needed efficiencies, they have not altered the industry's fundamental emphasis on marketing.

Despite its drawbacks, the differentiation strategy has been highly successful in providing an incentive to develop high-performance bulls, thereby enabling the industry to meet the fundamental need of dairy producers for a high-quality reliable product. If the industry makes no significant attempt to modify its emphasis on differentiation, dairy producers will continue to receive a high-quality product.

Nevertheless, the ACS survey indicated that, in addition to a high-quality product, producers wanted lower semen prices, particularly for the so-called "better bulls." The 1985 and 1987 studies of AI practices also noted the importance of price. According to the 1987 study, in order of ranking, natural service was preferred to AI because of: (1) conception problems with AI, (2) inadequate heat detection with AI, (3) bulls less costly to keep, (4) inconvenience of AI, (5) semen too expensive, (6) excessive labor requirements, (7) producer was not convinced of the benefits of AI, (8) unsuitable facilities for AI, and (9) the producer disliked the AI technician or salesperson.

The limitations of the differentiation strategy imply that the catalyst for lower semen prices will be industry maturity. Thus, the needs of producers for high quality and lower prices will be met, but at the cost of continued competitive turbulence—the historical impetus for change in the industry. Generally, such turbulence is unplanned and is therefore chaotic, especially as the organizations involved may have been struggling for several years before reaching the decision to consolidate.

An alternative approach to lower prices would require the AI industry to lower costs and initiate structural changes while organizations continue to operate from a base of financial strength. This will require eliminating or minimizing those aspects of the industry which raise costs: differentiation, overcapacity, overlapping marketing territories, etc. Differentiation based on intensive customer support, extensive research (sire proving), and developing a local image will inevitably raise industry costs.

The 1987 Ohio State study noted that AI practices varied widely among regions and, for that reason, favored regional marketing and education programs over a standardized national program. Yet, the arrival of maturity in an

industry generally lessens buyers' desire for service capabilities, like technicians, or for the reassurance embodied in the availability of a full product line. The latter is demonstrated by the emergence of so-called semen jockeys in the industry.

Differentiation creates other obstacles to lowering costs. If product differentiation is high and based on image, which is the situation prevailing in the AI industry, it can place limits on a firm's size and provide an umbrella that allows inefficient firms to survive. Across the industry, organizational size and other characteristics influence survival less than the one characteristic that all AI organizations have in common: a small number of bulls commanding premium prices. In this manner, the marketing strategy of differentiation contributes to, and even sustains, the fragmented industry structure and, therefore, excessive competition.

Surprisingly, industry observers and ACS survey respondents indicated that the intense competition between organizations ultimately lowered semen prices. This perception ignores the inefficiency that results from an industry structure that, in combination with differentiation, implicitly encourages producers to compare within the stud ("choose our best bull rather than our ordinary bull"), whereas the efficient comparison is across studs or organizations.

A substantive criteria for differentiation lowers buyers' cost or improves product performance. The existence of such a criteria is usually signaled by the ability to command and sustain a price premium in selling to well-informed buyers. The two-tiered pricing structure in the industry, of high- and low-priced bulls, suggests that some bulls are clearly unique according to producers, and some are sufficiently similar that they could be considered interchangeable. The component of prices that is attributable to the influence of status and prestige will likely decrease in the future as producers become more cost conscious with industry maturity. This development reflects the fact that "increasing buyer sophistication tends to threaten difficult-to-measure forms of differentiation that may have been accepted at face value in the past."

As these changes occur, advertising will become less important as a source of information about bulls. And as the scope for advertising to highlight a small group of bulls diminishes, and consequently, the differentiation strategy loses the source of its strength, the overall size of the lineup assumes more importance. In the short run, small organizations will try to keep up with competitors. In the long run, consolidation among organizations, through mergers or joint marketing, is inevitable.

Indeed, the potential for advertising, sales presentations, and other sales efforts to have less impact on the industry may be part of a general cycle experienced by other industries. In such cycles, periods where price cuts are the primary means of stimulating sales alternate with periods where product differentiation, advertising, and innovations in packaging or distribution are significant incentives by themselves. Price competition becomes pervasive when overcapacity in the industry has been created by the response to prior product changes and when possibilities for further improvements appear unlikely. As noted in the ACS survey:

"Take a good look at your operations and admit that the industry hasn't gained a thing in 20 years. Cows are still the same as they always have been. Feeds are making all the difference in production."

By these standards, if significant product changes do not occur through advances in biotechnology, the AI industry seems poised for a period of price competition. Nevertheless, improvements are possible in many areas: greater accuracy in sire proving, semen extension, packaging accompanied by centralized distribution, etc. Any of these changes could confer a competitive advantage sufficient to realign the structure of the industry.

Despite the drawbacks of the differentiation strategy, it cannot, and should not, be completely eliminated because (1) even if semen will increasingly be perceived as a commoditylike product by dairy producers, there will always be bulls that will command a price premium based on a combination of performance, status, limited supply, etc., and (2) genetic diversity is a necessary and desirable component of animal breeding.

So, two alternatives exist: a focus strategy where firms intensively serve particular customer groups or segments to the virtual exclusion of others, and a cost-leadership strategy.

The focus strategy is not particularly appropriate for the AI industry because the unpredictable results of sire proving force organizations to appeal to a broad spectrum of producers.

A cost-leadership strategy enables a firm or group of firms to become the "low-cost producer" within the industry, and usually incorporates the following elements:

1. construction of efficient scale facilities;
2. tight cost and overhead control;
3. cost minimization in areas like sales force and advertising;
4. greater coordination across functions and production facilities;
5. a wide line of related products to build volume, so long as the degree of product proliferation does not nullify the economies of scale resulting from the construction of efficient scale facilities; and
6. advantages like a high relative market share or favorable access to raw materials.

Differentiation is not incompatible with a cost-leadership strategy, but this combination has been precluded thus far by the nature of the industry. For example, the fundamental cause of high distribution costs in the AI industry is the onfarm delivery of semen and servicing of nitrogen tanks. As a result, the AI industry is labor-intensive. It is possible that this situation could be alleviated by producers willing to obtain semen and liquid nitrogen from a central distribution facility, eliminating the need for personal deliveries by AI sales representatives and technicians. The feasibility of this concept depends on the potential for producers to abandon traditional marketing practices.

Alternatively, an innovation of this kind could be forced on the industry through the efforts of an aggressive AI organization, farm supplies cooperative, or even a livestock marketing cooperative. Advances in biotechnology may also alter distribution patterns by changing the physical form of the product.

The other source of high costs may be easier and faster to change, the choice made by cooperatives to retain explicit marketing territories rather than to treat semen as the national market that it has become. Cooperatives are spread too thin by the need to maintain a strong local presence in their membership area while simultaneously developing national and foreign markets. As a result, the cooperative sector (and thus the industry as a whole) contains more organizations, more bull studs, and more bulls than are likely to be needed to accomplish the objective of providing a high-quality low-cost product to producers.

Summary of Industry Issues and Concerns

This strategy overview has identified six issues and conflicts affecting the future course and efficiency of the industry. These are:

1. The industry has excelled in delivering a high-quality product to producers. Maintaining this performance record should be the primary goal of the industry. This will require investment in biotechnology research.

2. Continued reliance on a marketing strategy of differentiation, an emphasis appropriate for a growing industry, has led to a degree of overcapacity that will conflict with the sensitivity to costs required of a mature industry. Thus, the industry will need to reduce overcapacity by cutting product lines (stud lists), and maybe also the number of sires proved.

The transition from one marketing strategy to another provides an opportunity for a firm or segment of the industry to initiate a cost-leadership strategy. Market strategists have noted that, "A cost leadership strategy can sometimes revolutionize an industry in which the historical bases of competition have been otherwise and competitors are ill-prepared either perceptually or economically to take the steps necessary for cost minimization." The effectiveness of a cost-leadership strategy lies in its challenge to traditional industry practices or beliefs, such as, "Everyone must have a full line" or "Customers trade up."

3. The industry also has high distribution costs attributable both to traditional marketing practices and to the nature of the physical product. It is not clear that these can be changed in the near future. Streamlining the structure of the cooperative sector to eliminate the conflict between old and new methods of semen marketing could offer potential for significant cost reductions.

4. The industry has not fully exploited the potential of heifer AI within the domestic mar-

ket. In part, this situation results from time constraints on AI sales representatives, which in turn result from excessive industry competition. To the extent made possible by producer preferences, heifer AI should be developed. This will likely require a marketing environment which provides the personal attention required for instituting new herd management practices. The same can be applied to another promising market segment, "low cow" users. Yet each of these segments will inevitably be developed as the forces of industry maturity compel AI organizations to seek new ways of gaining market share.

5. Continuing tension exists between product attributes highlighted by advertising and marketing and the actual physical limitations of semen, which lead to shortages. This tension is exacerbated for cooperatives by policy decisions allocating semen between member and nonmember sales. Advances in biotechnology may alleviate this tension and minimize any loss of credibility resulting from the fact that product performance is ultimately beyond the control of the industry. Reductions in credibility attributable to the industry's emphasis on advertising will also be minimized to the extent that buyers inevitably become more sophisticated and knowledgeable about AI. The industry could accelerate this process by providing education about AI that is perceived to be more objective than advertising and by reducing high-pressure selling tactics.

6. The tradeoffs between foreign and domestic sales will intensify in the future, particularly for cooperatives. Those favoring the domestic market argue that producer-members own and help sample bulls, therefore they should have priority during shortages. Others note that foreign sales have subsidized domestic sales, thereby lowering the prices paid by domestic producers and indirectly, improving their market access.

Intensified competition for overseas markets could initially exacerbate domestic shortages, but such competition should ultimately encourage cooperatives to seek alternative approaches to holding the line on domestic semen prices.

OPPORTUNITIES FOR COOPERATIVES

Because the cooperative sector has dominated the AI industry, it must take a large share of credit for industry performance and, also, considerable responsibility for the industry's future. Although the market share of cooperatives has been higher then the 64 percent reached in 1987 (especially before the influx of other organizations and the marketing changes brought about by freezing), the share of cooperatives appears to have stabilized during the past 5 years, fluctuating within a few percentage points (table 1). While maintaining two-thirds of the AI market, cooperatives will be required to adjust to the requirements of industry maturity by (1) stabilizing or reducing semen prices and (2) positioning themselves for the ramifications of advances in biotechnology.

It is impossible to predict what these industry changes will be, but it is nonetheless clear that semen marketing will be very different 5 to 15 years from now. To meet these challenges, the cooperative sector will need to restructure to lower production, marketing, and distribution costs and to engage in research that will enable them to continue to serve producers in the future as in the past.

The source of research funds for the cooperative sector is profits, and the source of profits is premium-priced bulls. Yet, the ACS survey indicated that producers wanted lower semen prices for such bulls. Consequently, the cooperative sector faces a tradeoff between serving producers now and serving them in the future. This dilemma is not unlike the choices that are routinely made by cooperatives in terms of member versus

Table 1—Cooperative market share, 1981-87

Year	Total dairy and beef breeding units sold (domestic, int'l, and custom sales)	Units sold by cooperatives	Co-op market share
			Percent
1981	19,344,011	10,504,897	54
1982	19,208,274	12,094,561	63
1983	19,288,562	12,355,711	64
1984	18,976,890	11,347,429	60
1985	18,277,657	11,364,757	62
1986	17,982,905	11,365,316	63
1987	18,945,728	12,103,439	64

Source: National Association of Animal Breeders.

nonmember sales. The noncooperative sector does not have to make such choices; it can simply sell wherever prices are highest. Therefore, the cooperatives have greater operating constraints than their competitors. Nevertheless, the cooperatives have significant advantages. Chief among these is the positive image of cooperatives as producer-oriented organizations. This was reflected in the ACS survey in comments like the following:

"As a cooperative, my local semen supplier is out to serve the farmer. The personnel are very knowledgeable, and they don't pressure you into buying like some semen salesmen do. I can rely on a prompt and scheduled visit every 4 weeks. The cooperative continues to have some of the best sires available."

"I use a cooperative because of a quality product at a fair price. Any profits the cooperative makes are returned to us, the owners."

"We have really been satisfied for many years with the staff, management, and board of directors of the cooperative. We have seen a marked, almost amazing, improvement in our young cattle during the last 5 years."

The other advantages of cooperatives are (1) a tradition of sustained contact with producers, especially through maintaining technician services despite the industry trend to direct herd sales and (2) for those cooperatives emphasizing repeatability, greater credibility among producers.

Most respondents appeared to be very satisfied with the services and products offered by AI cooperatives. Complaints were few. Those that were received reflected a need to further improve credibility, provide access to bulls from competing cooperatives, and coordinate and improve the quality of information given to producers.

Inadequate understanding of sire summaries was shown by survey comments like the following:

"Frequently, we are excited and sold on a 'new' bull who makes your list, only to have him 'disappear' shortly after. Why do bulls leave the lineup?

"Provide bulls that stay good, not this 'up or down,' or, 'real good and all of a sudden worthless.'"

"If bull lineups are changing or going to change so extensively before the new catalog comes out in the fall, provide extensive updates and prices to patrons in the spring. I'm tired of using a book for 6 months that is mostly outdated—many bulls no longer available, and new ones I have no information on."

Some examples of the effect of excessive industry competition:

"The cooperative should concentrate more on what they are selling instead of comparing everything to other bull studs. I'm buying individual bulls, not averages pitted against a private bull stud."

"Keep getting the best bulls available and reporting information honestly. Too many studs cover over faults, but the dairy producers find out anyway and then lose faith in the service."

"Make sure newsletter contains worthwhile information, not propaganda."

"Tell how sires will help and/or hurt type to improve mating. Provide all good and bad information on bulls. If the bulls have a type shortcoming, breeders should be told, as they are if a bull has improvement in a trait."

"Your bull proofs and indexes are so far off base on our particular breed as to be unbelievable. Everything is designed to make your bulls look better than they are, and everything else bad."

"Don't give us any 'baloney.' When the XYZ bull was first promoted, it was supposed to be 'Superbull.' You were left with a red face. We were left with cows that don't even average what herdmates do."

"I do have excellent results with a careful selection of your bulls—not the ones you push (try selling ABC heifers)."

"Try harder to recruit members that are not using AI at all rather than competing for business as hard against other AI studs."

These comments suggest a need to realistically acknowledge and educate producers about the limitations of AI, not just the benefits. Producers also requested education in other areas:

"Educate sales personnel in dairy cattle breeding, dairy cow structure, and dairy operations so they are knowledgeable and reliable when working with the dairy producer—not just a salesman."

"Provide improved public relations work among dairy producers. Don't just try to sell semen, but personal individual service."

"Educate dairy producers on how much money they should gross per year per cow and on what milk goes through the hose to pay bills with. Records can be misleading when you sell other stock."

As already noted, duplication of effort occurs through overlapping marketing territories. Yet there is also lack of coordination within organizations. Producers can discuss the merits of bulls and purchase semen from technicians, AI sales representatives, and herd analysts. Such extensive interface between producers and AI or breed organizations may be meant to facilitate semen purchases, but it may instead be a source of inefficiency:

"I think the route drivers, technicians, and fieldmen need to coordinate information. I don't think these people communicate. For example, a producer custom-mates a herd and needs unavailable bulls or the technician gets there and says use ABC bull, but he's not carrying it. Or the truck route gets there and the producer wants 10 of ABC bull and finds out it's in short supply and can only get 2 straws. Recently, I was using a bull from the technician for $15 a unit, and used about six or seven units. Come to find out this bull was on closeout on the truck route for $6 and only the truck driver knew this. Many times, it's like dealing with two or three different companies. One is the technician, then the truck route, and the other is all the stuff that comes in the mail."

Such comments indicate a need exists to simplify sire selection by utilizing a more varied and creative format for the sire directory than is current industry practice. Because sire directories are a form of catalog marketing, they, like other product catalogs, could be divided into sections identifying bulls appealing to specific groups of producers. Such preselected portfolios would simplify the breeding decision for those seeking convenience. Moreover, this approach would correspond to one of the often resisted requirements of industry maturity: the establishment of standard grades or products to replace a complex array of items in the line.

The degree of standardization possible with other products is precluded by the need for genetic diversity in animal breeding. Nevertheless, if, as industry observers suggest, some 20 percent of the available bulls supply 80 percent of the market, an implicit standardization has already begun to occur. The portfolio concept would broaden standardization to include a variety of bulls that, used as a group, could meet different breeding objectives. The portfolio approach of randomly mating a set of "good" bulls to the herd has been advocated on the grounds of scientific merit. The concept emphasized here is the potential for an alternative to custom individual mating as a marketing tool within the sire directory.

Producers occasionally noted the impact of product proliferation:

"The cooperative is used by dairy producers for the same reason as any other organization. They have bulls they promote—some are very good, while others are barely average."

"Lower the prices of your better bulls instead of those dumb specials that require you to purchase bulls you are not interested in! We have to buy so much semen on your specials, yet we have only 42 cows!"

Small or commercial producers were concerned that they had too little impact on their cooperative, whereas, large producers or breeders felt otherwise:

"Our local reps and technicians are only interested in large volume buyers. With our herd size (44 cows), we will not buy 20 units of a bull. However, we buy high-quality, higher priced bulls and feel our business is just as important. We almost never have had a rep visit us and must rely on our own information when the truck comes around. We find it irritating that our local rep gets a percent of our sales when he does not feel we are important enough to talk to."

"Listen to the little people (the average dairy or beef producer) and don't just try to involve the usual few who win the big awards. We've found that new people trying to get involved are often passed over or ignored completely by staff and field people who try to curry favor with the well-known breeders."

"Make sure the reps work with the large producers, not the real small ones. The profit, and a large percentage of the business, will come from the larger dairy farms."

It is possible cooperatives located in areas with substantial numbers of small producers could differentiate themselves by explicitly assigning staff to work with small producers.

Producers also objected to shortages of particular bulls arising from conflicts between member and nonmember sales. Excessive industry competition exacerbates this problem insofar as shortages in a particular region are artificially induced to gain market share in another area. Producers want different bulls, not necessarily different cooperatives. Thus, the importance of philosophical differences among AI cooperatives does not appear to be as pronounced as those among cooperatives in other commodities.

The simplest response to this situation is to give producers access to any bull from any cooperative, as they requested in the ACS survey, and, at the same time, let price allocate supply nationally. This would also reduce the market power of semen jockeys. This process would eliminate automatic member allocations of semen but, at the same time, would increase their access to bulls from other studs that might be just as good or better. Instead of semen, members could be allocated specialized services like technicians or custom-mating programs that continue to be restricted by geography. Some AI cooperatives are moving toward this approach, with tighter limits on the proportion of semen going to members as a percentage of a bull's production or time in service.

Since they are such a large proportion of the industry, cooperatives have a particular role in coordinating and improving product development, distribution, and marketing. Cooperatives have already advanced in this direction to the extent they have developed marketing federations or centralized production facilities. The cost-reducing possibilities of such measures would be maximized by eliminating all or most of the 20 local cooperatives in favor of a single centralized cooperative. Producers would become direct members of the new cooperative. Such consolidation would facilitate elimination of marginal bulls from the product line and, at the same time, increase the overall size of the lineup, which is the primary consideration motivating producers to choose one AI organization over another. The cost savings from such restructuring of the industry would enable cooperatives to develop a significant program of biotechnology research. Without such a program, they risk their stake in the future of the industry.

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U.S. Department of Agriculture
Agricultural Cooperative Service
P.O. Box 96576
Washington, D.C. 20090-6576

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